CLAIMS

What is claimed is:

1. A method comprising:

connecting a transmitter to a transmission line;

receiving an input signal; and

transmitting the input signal on the transmission line by switching between a first power source and a second power source to generate a balanced current signal.

2. The method of claim 1, wherein the balanced current signal comprises a positive domain image and a negative domain image and wherein the negative domain image is inverted from the positive domain image.

3. The method of claim 1, wherein the transmission line is a twisted pair cable.

4. The method of claim 1, wherein the input signal is a digital signal.

5. The method of claim 1, wherein the first power source is comprised of a direct current voltage source.

6. The method of claim 5, wherein the second power source is comprised of a sinusoidal waveform generator and the direct current voltage source.

7. The method of claim 6, wherein the sinusoidal waveform generator includes a direct current voltage offset.

8. A method comprising:

connecting a receiver to a transmission line;

detecting a balanced current signal on the transmission line by sensing a change in a current flowing through the transmission line.

9. The method of claim 8, wherein the balanced current signal is received as a positive domain signal image and a negative domain signal image.

10. The method of claim 8, wherein the transmission line is a twisted pair cable.

11. The method of claim 8, wherein the change in current is detected by sensing a change in a magnetic field surrounding the transmission line.

12. The method of claim 11, wherein the change in the magnetic field surrounding the transmission line is detected using a magnetic field sensor that includes giant magnetoresistive materials.

13. The method of claim 8, further comprising:

determining that the transmission line is active if current flow is detected through the transmission line.

14. The method of claim 7, further comprising:

determining that the transmission line is inactive if no current flow is detected through the transmission line.

15. A method comprising:

connecting a transceiver to a transmission line;

obtaining an input signal;

transmitting the input signal on the transmission line by switching between a first power source and a second power source to generate a balanced current signal; and

detecting the balanced current signal on the transmission line by sensing a change in a current flowing through the transmission line.

16. The method of claim 15, wherein the balanced current signal comprises a positive domain image and a negative domain image and wherein the negative domain image is inverted from the positive domain image.

17. The method of claim 15, wherein the transmission line is a twisted pair cable.

18. The method of claim 15, wherein the input signal is a digital signal.

19. The method of claim 15, wherein the first power source is comprised of a direct current voltage source.

20. The method of claim 19, wherein the second power source is comprised of a sinusoidal waveform generator and the direct current voltage source.

21. The method of claim 20, wherein the sinusoidal waveform generator includes a direct current voltage offset.

22. The method of claim 15, wherein the change in current is detected by sensing a change in a magnetic field surrounding the transmission line.

23. The method of claim 22, wherein the change in the magnetic field surrounding the transmission line is detected using a magnetic field sensor that includes giant magnetoresistive materials.

24. The method of claim 15, further comprising:

determining that the transmission line is active if current flow is detected through the transmission line.

25. The method of claim 15, further comprising:

determining that the transmission line is inactive if no current flow is detected through the transmission line.

26. A transmitter comprising:

a connection to a transmission line;

a plurality of power sources; and

a switch, wherein the switch is coupled to the plurality of power sources and wherein the switch generates a balanced current signal by switching between the plurality of power sources.

27. The transmitter of claim 26, wherein the balanced current signal comprises a positive domain image and a negative domain image and wherein the negative domain image is inverted from the positive domain image.

28. The transmitter of claim 26, wherein the transmission line is a twisted pair cable.

29. The transmitter of claim 26, wherein the plurality of power sources is comprised of a first power source and a second power source.

30. The transmitter of claim 29, wherein the first power source is comprised of a direct current voltage source.

31. The transmitter of claim 30, wherein the second power source is comprised of a sinusoidal waveform generator and the direct current voltage source.

32. The transmitter of claim 31, wherein the sinusoidal waveform generator includes a direct current voltage offset.

33. A receiver comprising:

a connection to a transmission line;

a current detector, wherein the current detector detects a balanced current signal by sensing a change in a current in the transmission line.

34. The receiver of claim 33, further comprising an amplifier to increase the amplitude of the balanced current signal prior to detection by the current detector.

35. The receiver of claim 33, wherein the balanced current signal is received as a positive domain signal image and a negative domain signal image.

36. The receiver of claim 33, wherein the transmission line is a twisted pair cable.

37. The receiver of claim 33, wherein the current detector detects the balanced current signal by sensing a change in a magnetic field surrounding the transmission line.

38. The receiver of claim 37, wherein the current detector is a magnetic field sensor that includes giant magnetoresisitive materials.

39. The receiver of claim 33, wherein the receiver determines that the transmission line is active if current flow is detected through the transmission line.

40. The receiver of claim 33, wherein the receiver determines that the transmission line is inactive if no current flow is detected through the transmission line.

41. A transceiver comprising:

a connection to a transmission line;

a transmitter comprising:

a plurality of power sources, and

a switch, wherein the switch is coupled to the plurality of power sources and wherein the switch generates a first balanced current signal by switching between the plurality of power sources; and

a receiver comprising:

a current detector, wherein the current detector detects a second balanced current signal by sensing a change in current.

42. The transceiver of claim 41, wherein the first and second balanced current signals comprise a positive domain image and a negative domain image and wherein the negative domain image is inverted from the positive domain image.

43. The transceiver of claim 41, wherein the transmission line is a twisted pair cable.

44. The transceiver of claim 41, wherein the plurality of power sources is comprised of a first power source and a second power source.

45. The transceiver of claim 44, wherein the first power source is comprised of a direct current voltage source.

46. The transceiver of claim 45, wherein the second power source is comprised of a sinusoidal waveform generator and the direct current voltage source.

47. The transceiver of claim 46, wherein the sinusoidal waveform generator includes a direct current voltage offset.

48. The transceiver of claim 41, wherein the receiver further comprises an amplifier to increase the amplitude of the second balanced current signal prior to detection by the current detector.

49. The transceiver of claim 41, wherein the current detector detects the second balanced current signal by sensing a change in a magnetic field surrounding the transmission line.

50. The transceiver of claim 49, wherein the current detector is a magnetic field sensor that includes giant magnetoresistive materials.

51. The transceiver of claim 41, wherein the transceiver determines that the transmission line is active if current flow is detected through the transmission line.

52. The transceiver of claim 41, wherein the transceiver determines that the transmission line is inactive if no current flow is detected through the transmission line.

53. A communications system comprising:

a transmission line;

a transmitter coupled to the transmission line, wherein the transmitter transmits a digital signal on the transmission line by switching between a first power source and a second power source to generate a transmitted signal and wherein the transmitted signal is a balanced current signal; and

a receiver comprising a current detector, wherein the receiver is coupled to the transmission line and wherein the receiver detects the transmitted signal generated by the transmitter by sensing the current changes in the transmission line using the current detector.

54. The communications system of claim 53, wherein the transmission line is a twisted pair cable.

55. The communications system of claim 53, wherein the first power source comprises a direct current voltage source.

56. The communications system of claim 55, wherein the second power source comprises the direct current voltage source and a sinusoidal wave generator.

57. The communications system of claim 53, wherein the current detector detects the transmitted signal by sensing a change in a magnetic field surrounding the transmission line.

58. The communications system of claim 53, wherein the current detector is a magnetic field sensor that includes giant magnetoresistive materials.

59. The communications system of claim 53, wherein the transmitter or receiver determines that the transmission line is active if current flow is detected through the transmission line.

60. The communications system of claim 53, wherein the transmitter or receiver determines that the transmission line is inactive if no current flow is detected through the transmission line.

61. A communications system comprising:

means for transmitting a balanced current signal on a twisted pair cable; and

means for receiving the balanced current signal by detecting a change in current on the twisted pair cable.

62. The communications system of claim 61, wherein the means for transmitting a balanced current signal comprises means for switching between two power sources to generate a positive signal image and a negative signal image.

63. The communications system of claim 63, wherein the means for receiving the balanced current signal comprises means for sensing a change in a magnetic field surrounding the twisted pair cable.

64. A method comprising:

encoding a communication signal into a balanced current signal by switching between a plurality of voltage potentials, wherein the communication signal is comprised of a positive signal image and a negative signal image;

transmitting the current signal on a current loop; and

detecting the current signal by sensing a change in current through the current loop.

65. The method of claim 64, wherein the plurality of voltage potentials is comprised of a constant voltage potential and a sinusoidal voltage potential.

66. The method of claim 65, wherein the sinusoidal voltage potential is a sinusoidal voltage that is offset by a constant voltage.

67. The method of claim 64, wherein the communication signal is a digital signal.

68. The method of claim 64, wherein the sensing the change in current comprises sensing a change in a magnetic field surrounding the current loop.